vol. IV no. 7
March, 1945

School Shop

FOR INDUSTRIAL ARTS & VOCATIONAL EDUCATION TEACHERS

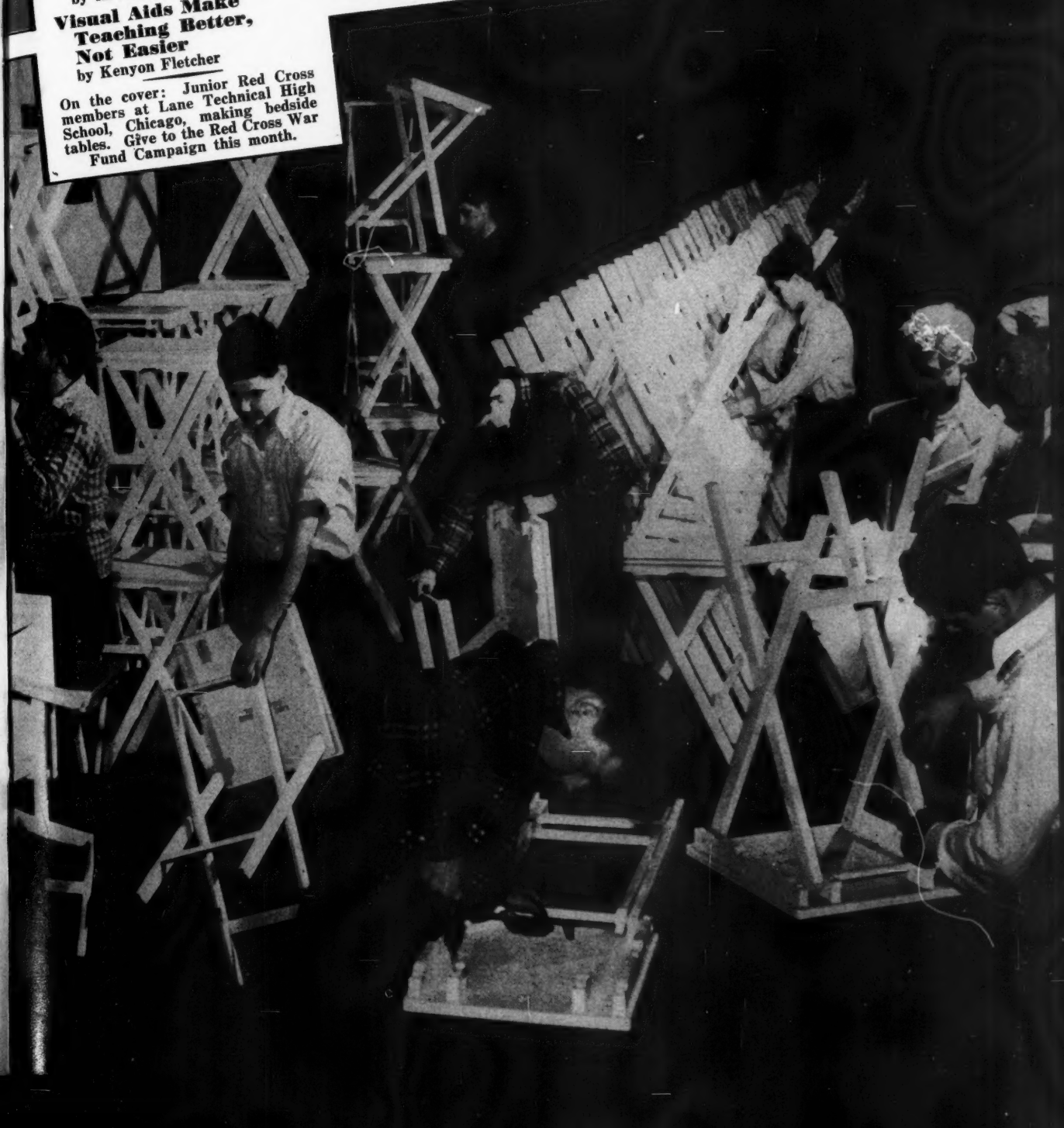
High-School Youth Still Need PIT
by Major R. C. Wenrich

Blueprint Reading Course
by Benjamin J. Stern

Goals Broadened in Graphic Arts
by A. Raymond Hopper

Visual Aids Make Teaching Better, Not Easier
by Kenyon Fletcher

On the cover: Junior Red Cross members at Lane Technical High School, Chicago, making bedside tables. Give to the Red Cross War Fund Campaign this month.



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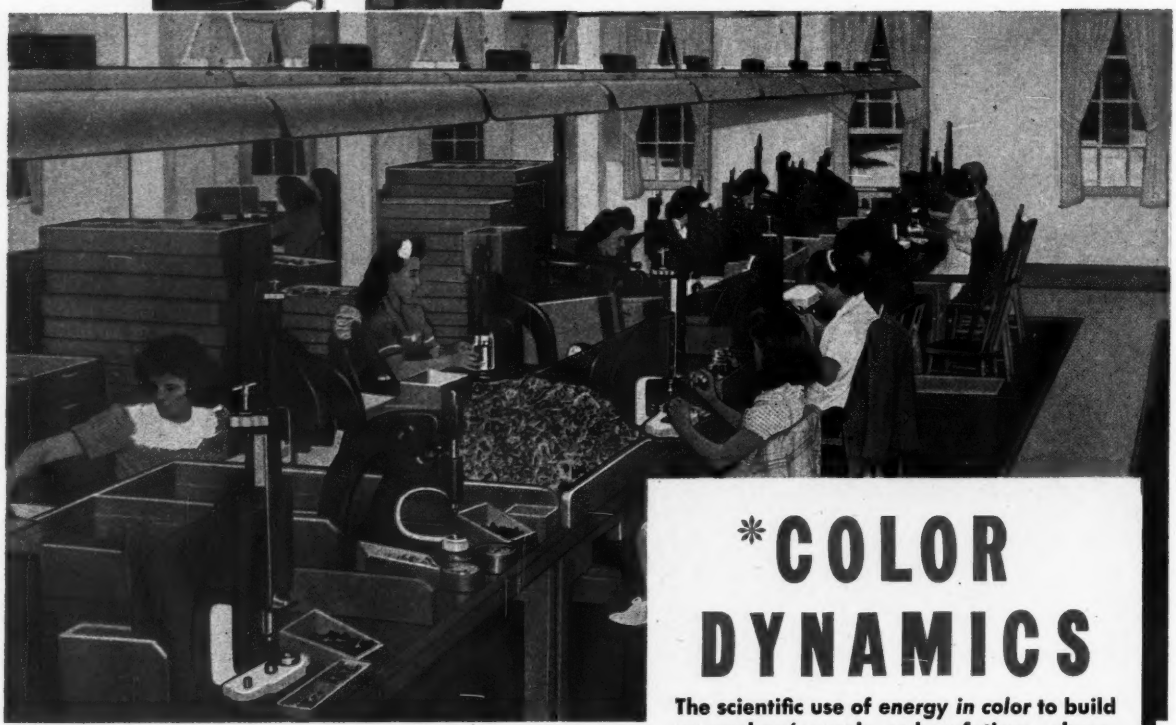

Interior of plant of The Wm. L. Gilbert Clock Corporation, Laconia, N. H., after repainting according to principles of COLOR DYNAMICS.

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The scientific use of *energy in color* to build up workers' morale, reduce fatigue, absenteeism and accidents and improve quality and quantity of production.

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Forthcoming issues of SCHOOL SHOP will bring you a description of California Polytechnic College's "upside-down educational plan," more articles in the current machine-shop series by Adams and Goodwin, several articles on the use of visual aids, and a description of a course in electronics at the high-school level. Watch also for project material and the regular features such as "School Shop Kinks," "Instructional Resources," and "from Washington."

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School Shop

FOR INDUSTRIAL ARTS & VOCATIONAL EDUCATION TEACHERS

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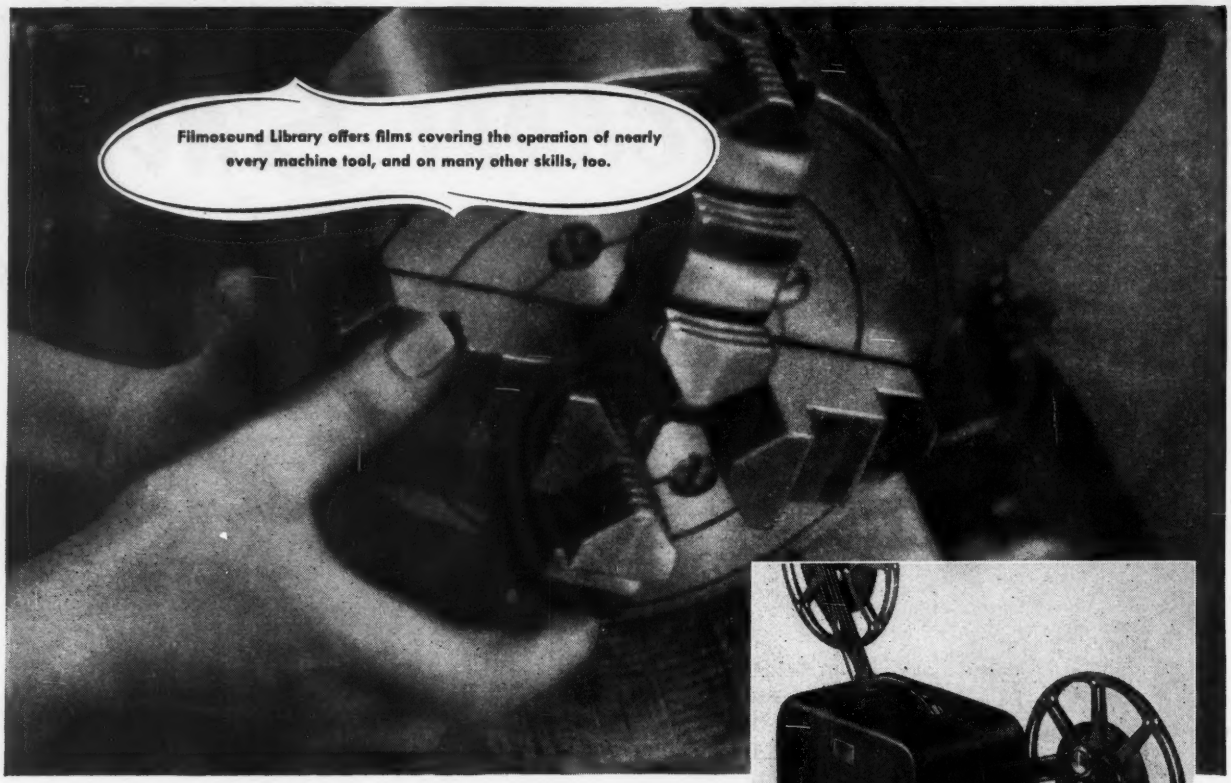

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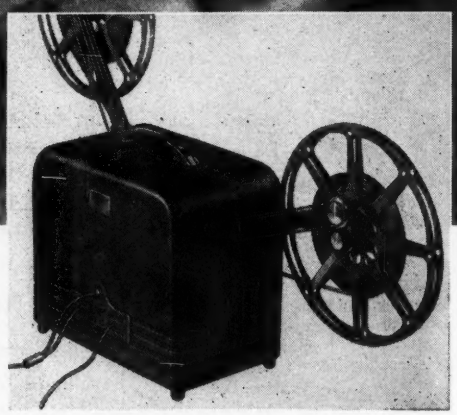

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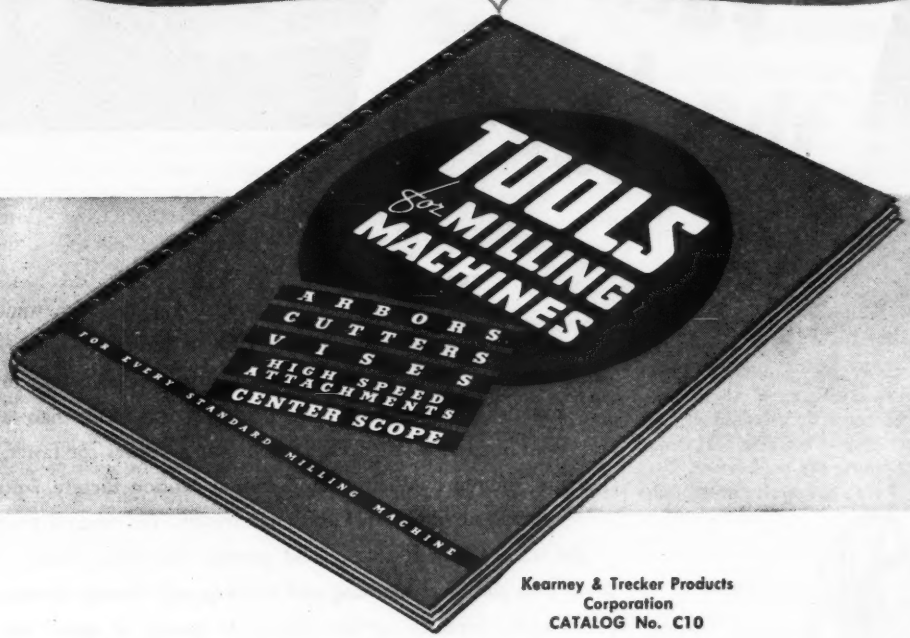

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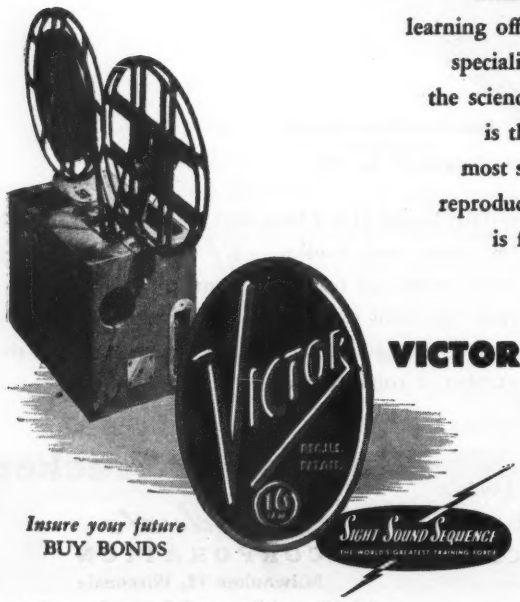

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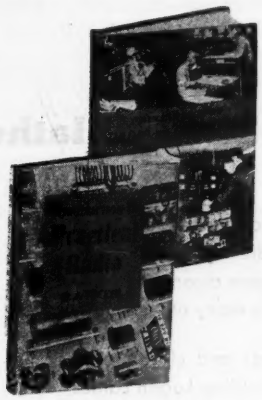

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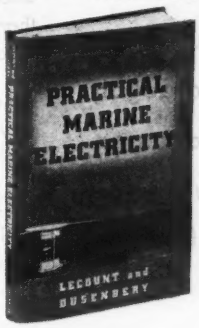

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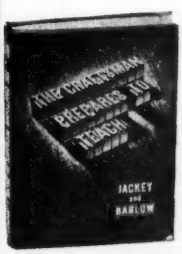

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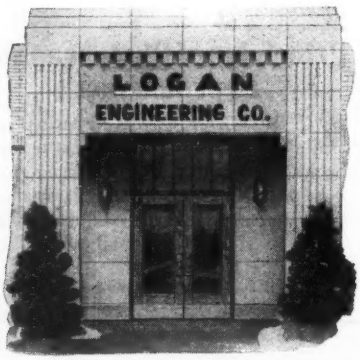

Further messages in this series will give you more reasons why it will pay you to see your Logan Lathe dealer or write direct to Logan Engineering Co. for catalog before you invest in a new lathe

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A-1

High-School Youth Still Need PIT

BY *Major R. C. Wenrich*

Preinduction training will be needed as long as this country is at war. All 18-year-old youth who are physically fit are destined for the Armed Forces. Shop teachers have a continuing responsibility to their students and to the nation for giving preinduction training. Major Wenrich is Chief, Preinduction Training Section, Headquarters, Army Service Forces.

AN alarming tendency is apparent to neglect the preparation of young men yet to be inducted into military service. For weeks our newspapers have carried headlines of spectacular allied victories on all fronts. Such persistent reports naturally incline us toward optimism concerning an early conclusion of the war and tempt us to relax our efforts in those war jobs which have, by now, lost some of their glamor and which are needed only in the event of a continuation of the war.

Such optimism is dangerous! The war is not yet over! Prime Minister Churchill, several weeks ago, said, "I certainly cannot predict or still less guarantee the end of the German war before the end of spring or even before we reach early summer." More recently, he said his prediction of a possible end by "early summer" might be revised by dropping the word "early." He also stated it would not be prudent to assume that the war against Japan could be won in less than 18 months after Hitler's downfall.

No, the war is not yet won and so long as the war continues we shall need trained men to replace those who, for one reason or another, are lost to the armed forces. The National Director of Selective Service has said, "The daily crop of 3300 American boys turning 18 will continue to be harvested after Germany collapses and even after the total strength of the armed forces is being reduced."

There are approximately 100,000 boys who reach the age of 18 in this country each month. Of those 60,000 are physically fit for general military service. The majority of those physically fit have completed or are enrolled in high school. This means that you have in your classrooms this year a majority of the young men who must fill Army quotas for replacements in the future. You may rest assured that every physically fit boy approaching the age of 18 in your high school is a potential inductee for military service, and anything you can do to prepare him for it will be of great value to him and to the service he enters.

The fact that this is a mechanized war is well known to all of us. Most of us also know that many Army jobs have counterparts in civilian life. Therefore, many older men who came into the service during the earlier days of mobilization brought with them occupational skills useful to the Army. However, the 18-year-old inductees have little opportunity to gain such experience prior to induction; many of them must rely wholly on the training received in school for their background of occupational skills.

There are those who say the Army no longer needs any great number of men with technical skills, since the Signal Corps, Engineers, Ordnance, and other technical services are practically filled and have need for few replacements. It is true that the Army's greatest need at the present time is for men to form new units or to serve as replacements in existing units in the Army Ground Forces, but technically trained specialists are as essential here as in any other branch of the service. Let me give you a list of specialists in the headquarters company of any infantry regiment:

4 code clerks	1 automobile mechanic
1 draftsman	19 radio operators
9 truck drivers	4 switchboard operators
15 telephone and telegraph linemen	1 radio repairman

To say nothing of the bugler, cooks, and others.

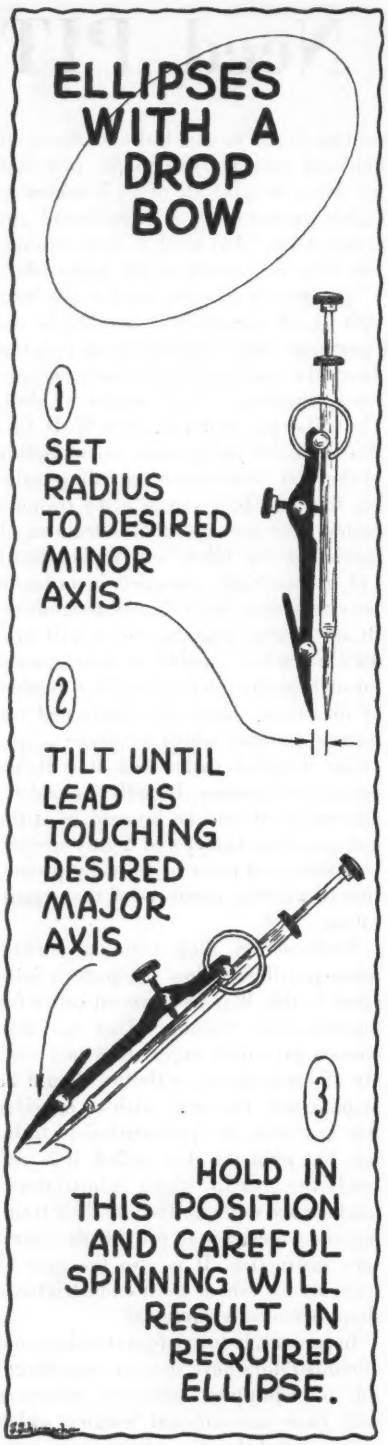
The Preinduction Training Section has recently completed a survey of soldier opinions concerning the value of preinduction training. A large percentage of the replies volunteered additional information regarding the value of shop training. Let me read a few of the many hundreds of comments received from soldiers in all types of Army jobs:

An Army Air Forces gunnery student says, "I think the courses that would do the most good are those that encourage work with the hands." An armorer-gunner recommends that, "a student in high school who is going to enter the armed services soon should take as many courses in the mechanical and electrical fields as possible, due to the fact that the Army in most all of its branches is highly mechanized." A switchboard operator states, "Any kind of shop training will help any youth in his Army life."

The Army's greatest need is for men with broad foundational training in occupational skills rather than training directed toward specific military occupations requiring a high degree of skill. The following quotation from W. D. Cir. 267 indicates the present broad policy of the War Department regarding training that will be given in army training centers after induction: "The training of specialists for fillers and replacements will be materially curtailed in order to provide greater flexibility of assignment. Broad general training which will produce a worker capable of development through on-the-job training in a number of directions should be substituted for narrow training which produces a specialist designed to be used at a highly specific occupation. Broadly trained replacements should be brought in at the bottom of the ladder and highly specialized advanced posts be filled by promotion of existing members of the organization."

Preinduction shop training should, when possible, follow the pattern indicated in this War Department order for postinduction training. That is, shop courses providing experiences in a variety of occupational activities should be emphasized. You may wish to consider this as a type of "prevocational" training, but whatever it is called, it is certainly the area for which industrial-arts teachers are well qualified by their training and experience to provide the necessary instruction. It is also the type of training for which most industrial-arts shops are ideally equipped.

In general, industrial-arts teachers and administrators have done a magnificent job of equipping potential inductees with basic occupational training which will be helpful to them in military service. The Army has no desire or intention to run the schools of the nation. It is our job simply to discover Army needs which may be met through training prior to induction and to state these needs to civilian training agencies. It's not our job to tell you how or to what extent you should adjust your school programs to meet these needs. That is your responsibility.


ELLIPSES WITH A DROP BOW
1
SET RADIUS TO DESIRED MINOR AXIS
2
TILT UNTIL LEAD IS TOUCHING DESIRED MAJOR AXIS
3
HOLD IN THIS POSITION AND CAREFUL SPINNING WILL RESULT IN REQUIRED ELLIPSE.

BY *Stan Schirmacher*

Stan Schirmacher teaches industrial arts at the Tempe Union High School, Tempe, Arizona. During the past three summers he has done drafting at the Goodyear Aircraft Corporation plant at Phoenix, Arizona.

Blueprint Reading Course

BY *Benjamin J. Stern*

MACHINE AND METAL TRADES HIGH SCHOOL, NEW YORK, N. Y.

THE reading of blueprints and technical drawings has assumed great importance in the category of wartime skills. Thousands of people who previously had never even heard of the subject are now finding it a prime necessity in their daily work in war plants. As a result there has been a corresponding growth of interest in the teaching of blueprint reading. A main consideration to be kept in mind in planning a course in the subject is that *time is of the essence.* It is necessary to streamline the contents, to strip them to fundamentals, and to simplify them to the greatest possible degree. In this connection I offer the following course of study in blueprint reading which has stood the test of application.

The course is divided into units. This allows for flexibility in application as the time for each unit can be varied to suit the capabilities and apperceptive background of the students. As each unit or a group of units is completed it is important that the students be tested as to their grasp of the learning content of these parts. There now exists plenty of material in the way of texts and visual aids. In fact the difficulty lies in choosing the best for the particular need.

Since the books I use are arranged as workbooks, they serve to assist the instructor in keeping his lecturing to a minimum. The students should also be required to keep notebooks in which can be entered pertinent notes and sketches.

Unit 1. Fundamentals:
- *a)* Introduction to course. Motivation.
- *b)* Theory of shape description. Orthographic projection developed in its simplest form.
- *c)* Theory of size description. Dimensions in their simplest form.
- *d)* Some tips on free-hand sketching. (Note: In handling fundamental theory, the instructor should use the simplest of language, illustrations, and models. Some instructors prefer to teach the ideas of shape and size at different stages. My experience has led me to tie them up immediately thereby saving time and setting a firm foundation at the start.)

Unit 2. Relationship between the views:
- *a)* Recognition of fundamental principles of reading drawings.
- *b)* Reading the views in conjunction with one another. (Note: This is of prime importance. The student must grasp the idea that a print can only be read by scanning the views in relation to one another.)

Unit 3. Alphabet of lines:
- *a)* A.S.M.E. standards.
- *b)* Angles (Note: This is a broadening and amplification of the work of Units 1 and 2. I found it best, in introducing the subject, to steer clear of technical terms until the ideas expressed in Units 1 and 2 are firmly grasped by the student.)

Unit 4. Scale of drawing:
- *a)* Meaning and application of scale.

Unit 5. The caption block:
- *a)* Information to be found in the name block on blueprints.
- *b)* Drafting-room standards.

Unit 6. Review and practice in reading easy blueprints:
- *a)* Question-and-answer method.

Unit 7. Shop marks and notes:
- *a)* Finish marks, A.S.M.E. standards.
- *b)* Notes on machining operations.
- *c)* Drilling, counter boring, etc.

Unit 8. Conception of tolerances:
- *a)* Fractions and decimals.
- *b)* Systems of tolerance, Ford's system, etc.

Unit 9. Sections:
- *a)* Theory of sections.
- *b)* Recognition of cutting plane line.
- *c)* Full section, half section, etc.
- *d)* Standard material sectioning.

Unit 10. Threads:
- *a)* Theory of threads.
- *b)* Various types used in U.S.A.
- *c)* Standard American forms (C. and F.).
- *d)* Fits.
- *e)* Conventional representation. Threads and taps.

Unit 11. Auxiliary views:
- *a)* Theory of oblique surfaces.

Unit 12. Pattern and foundry practice:
- *a)* Information on elementary pattern practice.
- *b)* Making a mold.
- *c)* Coring.
- *d)* Drawing notes.

Unit 13. Practice in reading casting blueprints:
- *a)* Shop notes and specifications.

Unit 14. Advanced theory of sectioning:
- a) Revolved sections, removed sections, off center cutting planes, etc.
- *b)* Violations of drawing practices.
- *c)* Phantom sections.

Unit 15. Assembly drawings:
- *a)* Theory of assemblies.
- *b)* Part numbers.
- *c)* Bill of material.
- *d)* Details.

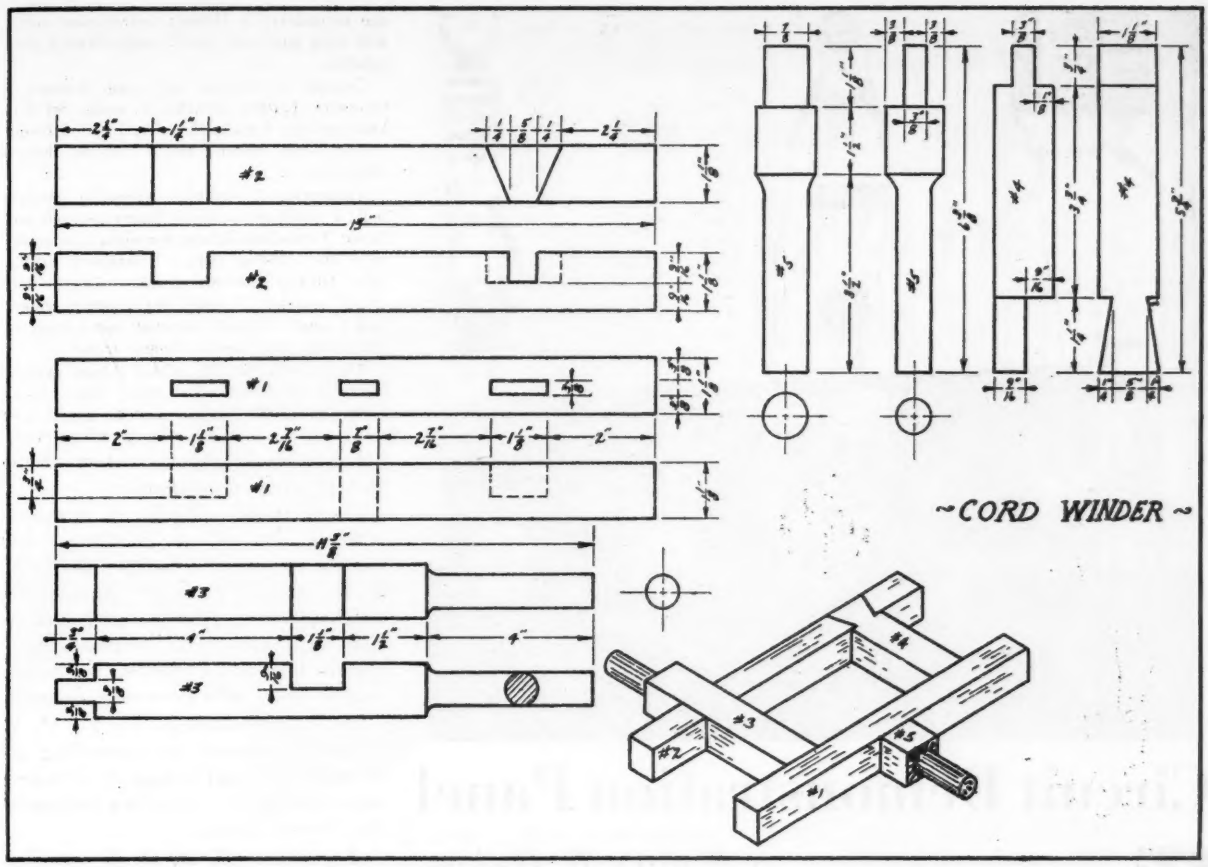
Unit 16. Materials (information):
- *a)* Ferrous materials.
- *b)* Nonferrous materials.
- *c)* Alloys.

Unit 17. Recognition of machine elements:
- *a)* Gears.
- *b)* Cams.
- *c)* Links and levers.

Unit 18. Tools:
- *a)* Theory of mass production.
- *b)* Jigs, fixtures, and dies.
- *c)* Small tools.

Unit 19. Practice in reading advanced blueprints.

Unit 20. Review.



Cord Winder

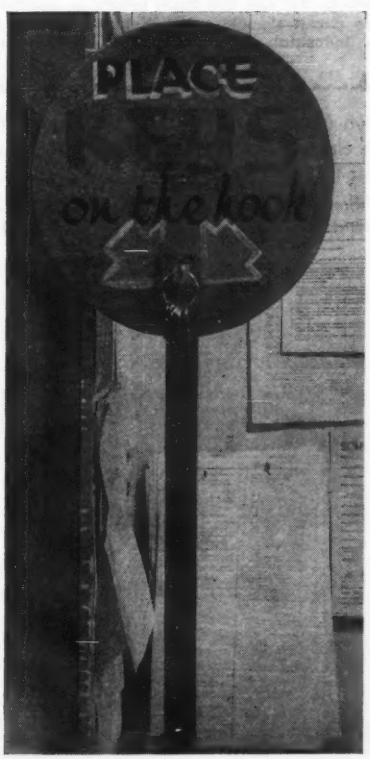
BY *F. N. Newton, Jr.*

This project is useful for winding clothesline, kite string, wire, or other material around the home and contains excellent instructional possibilities for elementary woodworking classes. The author is Supervisor of Industrial Education, Sharon, Pennsylvania, Schools.

TESTED INSTRUCTIONAL PROJECT

THIS woodworking project is used in our eighth-grade classes in order to acquaint students with the various joints in woodworking. They later apply their knowledge in the construction of the various projects they build in all of our woodshop programs.

An excellent feature of this project is that we are able to utilize a good bit of our otherwise scrap lumber in making it. This is of considerable importance now with the scarcity of lumber and the difficulty encountered in securing enough for the successful operation of our shops. Patience and good workmanship are required of the student to make a well constructed winder—desirable educational objectives in themselves.



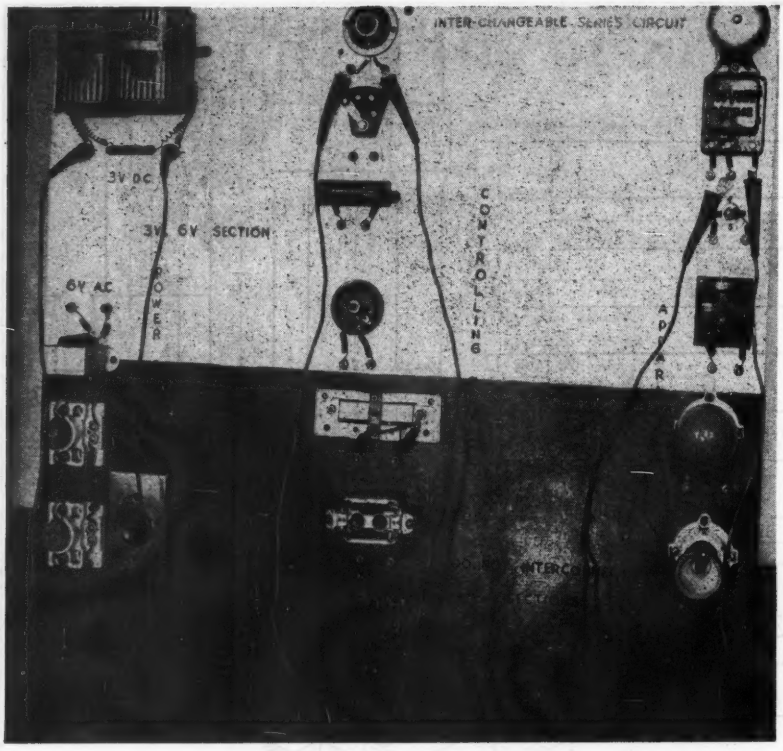
A Teacher's Key Rack

BY *Evarett I. Russ*
AND *S. S. Palestrant*

WILLIAM H. TAFT HIGH SCHOOL,
NEW YORK, N. Y.

TESTED INSTRUCTIONAL PROJECT

ONE of the plagues that a shop teacher need no longer endure is the never-ending search for misplaced keys. A large panel, not unlike a bus-stop sign, with a single hook screwed to it and just labelled Keys," solves the problem. This can be put at some convenient location where all the class can readily see it. The writers found that the keys hardly ever were taken off and not returned. The large plaque seems to make the keys everyone's responsibility. Even if the keys were left on a bench, someone in the room usually made it his or her business to replace them on the hook. The accompanying illustration shows a desk-type stand. This and a floor-type stand have been in long and successful use.



Circuit Demonstration Panel

BY *Walter B. Weber*

Instructors in electricity and household mechanics will find this panel helpful in illustrating circuit elements. Mr. Weber is Instructor in Industrial Arts, State Teachers College, Buffalo, N. Y.

THE experimental panel described here has been very useful in demonstrating to students the relationship that exists between different types of electrical circuits. With this teaching aid, for instance, the same wires and the same connections can be used to make an electric bell ring, a lamp to light or dim out, a motor to operate, a heater unit to glow, or achieve several similar results. Both signal and light voltages can be employed. After the student has experimented with this panel, we have found that he achieves a real understanding of the relationship between various simple electrical circuits.

There are three important wiring rules which can be taught with this device:

Rule No. 1.—Connect one side of the power to one side of the control.

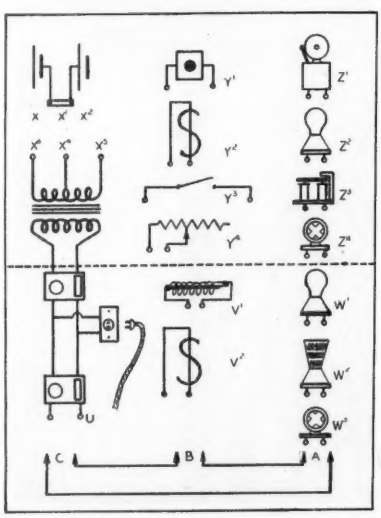
Rule No. 2.—Connect the other side of the control to one side of apparatus.

Rule No. 3.—Connect the other side of the apparatus to the other side of the power.

The fundamentals of electricity should be explained as well as the mechanical means of utilizing electric energy, of course. The three procedures are applied to the control of any type of equipment whether it be radio, telegraph, telephone, light, power, or other circuits.

Most of the parts used in the construction of this visual aid can be purchased in electrical or even ten-cent stores. The list follows:

Power supply.—2 dry cells, 1½ volts, 25 amp.; 1 bell-ringing transformer with two-volt-age secondary; 1 110-volt convenience outlet with plug and cord; and 2 single branch plug cutouts.



Controls.—1 electric bell push button; 1 two-point battery switch; 1 small S.P.S.T. knife switch; 1 radio rheostat; 1 S.P. 110-volt, 5 amp. snap switch; and 1 110-volt thermo blink flasher.

Apparatus.—1 ordinary vibrating electric bell; 1 miniature porcelain-base receptacle and lamp; 1 standard Edison porcelain-base receptacle and 110-volt lamp; 1 standard Edison base 110-volt sun-bowl heater unit; 1 telegraph sounder; 1 small toy electric motor; and 1 small 110-volt universal motor from an old sewing machine or electric mixer.

Wiring.—10' No. 18 twisted cotton covered cord; 6 insulated wire clips; three dozen 1" x 8 x 32 R.H. brass machine screws and nuts; and 6 sets of two-wire porcelain cleats.

Following is an explanation of the various terminal connections:

Power supply.—X, X^1, X^2 terminals represent the d-c signal voltage; this voltage is secured from two dry cells. X^3, X^4, and X^5 terminals represent the a-c signal voltage; this voltage is secured from the transformer. U terminals represent the 110-volt a-c lighting circuit; this voltage comes from a convenience outlet.

Controlling devices.—Y^1, Y^2, Y^3, Y^4 terminals represent the controlling devices for the signal voltage. V^1, V^2 terminals represent the controlling devices for the 110-volt circuit.

Apparatus.—Z^1, Z^2, Z^3, Z^4 terminals represent the apparatus for the signal voltage. W^1, W^2, W^3 terminals represent the apparatus for the 110-volt a-c circuit.

A typical experiment might be conducted as follows: The student connects the two apparatus wire clips (A) to the two terminals of the low-voltage lamp Z^2, the two control wire clips (B) to the battery switch terminals Y^3, and the two power wire clips (C) to the battery terminals X and X^1. When the switch is turned on the lamp will light dimly. The X^1 power clip is then changed to X^2 and when the switch is turned on the lamp will burn brightly. The control wires are then shifted to the rheostat terminals Y^4 to dim and brighten the lamp.

Any number of instructional combinations of power, apparatus, and controls can be made. He must remember, however, not to interconnect the signal and 110-volt sections.

A valuable instructional procedure is to have the student keep an analysis chart of various hook-ups. The chart should have headings across the top of "Apparatus (Leads A)," "Control (Leads B)," "Power (Leads C)," and "Application." The student can fill it in for as many hook-ups as possible.

It will be noted that the picture does not show the electric motors.

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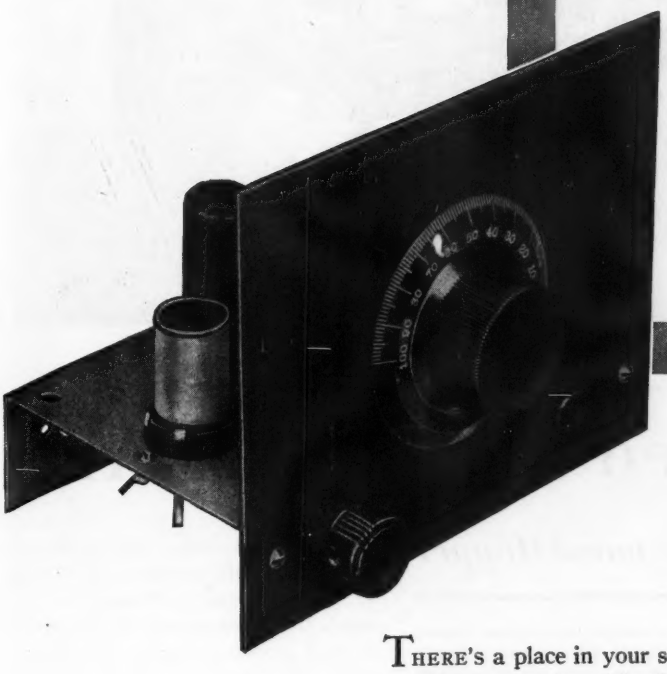

THERE'S a place in your science or shop course for objective instruction in radio, for with frequency modulation a household word and television just around the corner, many of your students will choose a career in radio or electronics.

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These Meissner Student Kits are the same kits used by the U.S. Army Signal Corps for basic radio instruction. They are also used successfully to teach radio in many vocational schools. "Add on" kits can be obtained at low cost to convert the 1-tube receivers into 2 or 3-tube sets. For advanced students use the 6-tube 2 Band Kit—extensively used by both the Signal Corps and the Navy.

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Goals Broadened in Graphic Arts

BY *A. Raymond Hopper*

Graphic arts has general educational values as well as vocational and the author points out that the vocational values are not confined to composition and press work but encompass a large number of fields allied with the printing industry.

SEWANHAKA HIGH SCHOOL, Floral Park, New York, is achieving remarkable success in broadening its graphic-arts instruction to meet the trends in general and vocational education. The story, as told me by the vocational director, Dr. Hugh Flaherty, shows a skilful blending of far-reaching vision and practical realism that could be applied to advantage in schools all over this land. The results are inspiring and even amazing.

Students have gone out from Dr. Flaherty's courses into good paying jobs in printing plants. They are also found in responsible positions in all sorts of businesses in which graphic arts play an important role. One publishes two weekly newspapers, one of which competes with a similar paper published by another Sewanhaka graduate. A girl added journalism and printing to her regular academic studies. She is now assistant editor of a house organ put out by a large communications equipment manufacturer. A boy who concentrated on printing has become buyer of design and printed matter for one of the largest soap advertisers. Another has developed into a typographic expert with a leading advertising agency.

Some former students are using their graphic-arts training in government service and the Armed Forces. One has gone through the apprentice school of the U. S. Government Printing Office and one the Interior Department's Bureau of Engraving. One is doing highly skilful work as a topographic draftsman. Just a month ago, Dr. Flaherty heard from a one-time student now with a front-line mobile map-printing unit. A co-ed is now a WAVE editing a service publication at Washington.

All of this is a far cry from the narrow notion of graphic-arts instruction being merely a road to setting type or running a press. These creative factors develop student enthusiasm and arouse ambitions to achieve high places in the business world. They result from tying-in, from the very start, printshop training with its practical applications in the many businesses and professions using the graphic arts. Thus, composition, typography, presswork, make-up, linotyping, and bookbinding become, in the students' minds, stepping stones to advertising, publishing, editorial work, and other such important phases of modern business. In fact, Dr. Flaherty feels that it is a basic obligation of the graphic-arts instructor to point out early and continuously the wide field of influence that the graphic arts has on everyday life. This is a principle he has adhered to strictly for the last 14 years.

Classes in composition, layout, imposition, mat and stereo making become vitalized when the problems of newspaper and magazine publishing are discussed. Daily newspapers and magazines are used as object lessons, and specific department store and other advertisements are analyzed to demonstrate the principles of design and typography. Students are constantly given the "why's" as well as the "how's."

Definite tasks are assigned as work projects, similar to those the student will meet in practical business. When broadsides, booklets, or other mailing pieces are to be set up and printed, the instructor shows how direct-mail advertising is planned and used to increase sales, how and why it must conform to established sales policies, how it affects the movement of merchandise or influences the thinking of readers.

Such an intimate tie-up between craft mechanics and business principles enables students to grasp more readily what they are taught. The knowledge they gain becomes realistic. Their interest is held more firmly. Graphic-arts projects are tackled with vigor, and are really understood as steps of the stairs to a definite goal. This stimulates interest, often helps students discover their own leanings, and influences the choice of a vocation or profession to which they can make a constructive contribution.

So important is this broadening effect considered at Sewanhaka that graphic-arts education is considered a part of general education, not something separate and distinct. *(Continued on page 20)*

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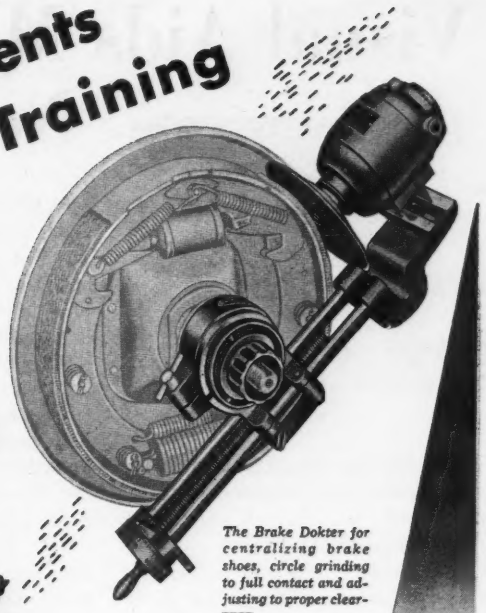
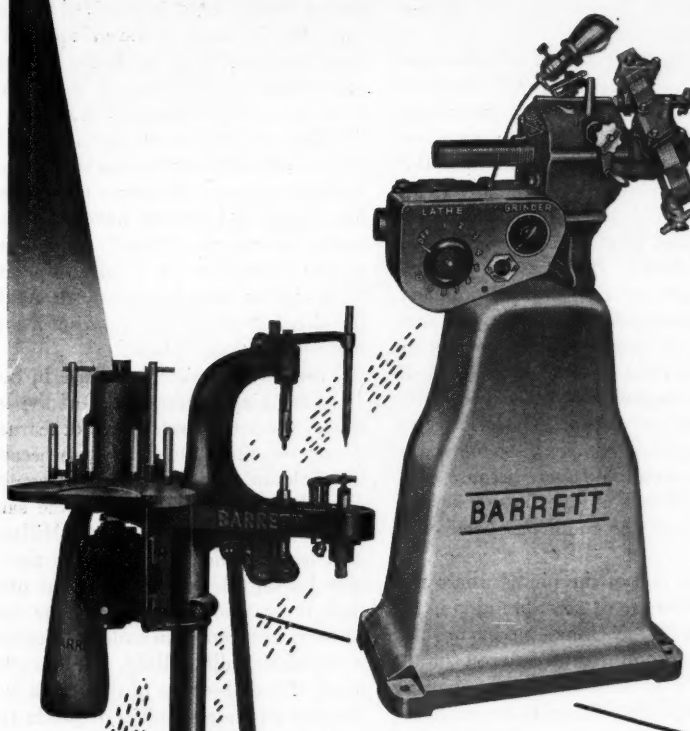


The Brake Dokter for centralizing brake shoes, circle grinding to full contact and adjusting to proper clearance.



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Visual Aids Make Teaching *Better* Not *Easier*

By *Kenyon S. Fletcher*

Courtesy Jam Handy Organization

Proper planning is the keynote of successful utilization of visual aids in the shop and drawing room. The author, who is Illinois State Supervisor of War Production Training, points out how the "G.I. way" can be effectively modified for school use.

THERE is no question about it: The remarkable success attained by the armed forces through using visual aids in training soldiers and sailors to do their military jobs is going to bring visual aids prominently into use in the school shop and drawing room. The nation has been conditioned to learning the "G.I. way" and is expecting the schools to produce phenomenal results through use of devices developed for speeded-up instruction during the war.

Comparable results might be obtained in schools if the conditions were similar to armed service training, but duplication of such conditions would be extremely difficult, even if desirable. The problem facing shop and drawing teachers is how to adapt the "G.I. way" to the regular school situation.

The instructor who thinks the use of instructional aids such as the motion picture, film strip, and sound on record are going to make teaching easier is doomed to disappointment. These devices may make teaching *better* if properly used, but not easier. Like any other instructional tool, they form only a part of the teaching process and cannot be expected to do the whole job. The instructor must intelligently fit their use into his plan of teaching, knowing fully just what part of the lesson is being served and carefully integrating that part into the whole plan.

The fact that a film or other visual aid is available is a poor criterion for its inclusion in the teaching plan. The instructor must be satisfied that the device is the *best* one for the particular part of the lesson. The mere showing of pictures guarantees nothing in the way of instruction. One instructor, in a letter requesting the loan of films, indicated that he wanted enough to provide a "58-minute program" for his class. If a "program" was his objective, perhaps a 58-minute "show" was all right; however, if instruction is to be the objective, much more than a "show" is required. The instructor must first determine his objectives, or what he hopes to accomplish in the way of instruction. He must then outline his plan and establish objectives for each step in the plan. Available visual aids should be considered from the viewpoint "Is this device the best possible means of attaining the objective?" Good teaching requires the use of only the best devices for the purpose at hand.

If it is determined that a motion picture, film strip, or other such device is to be used, good planning makes it necessary for the instructor to view the film privately one or more times so that he is thoroughly familiar with its content. He plans how he is to introduce the film and what he is to do after it has been shown. He plans for physical details such as projection equipment, seating arrangement, lighting of room, operator of projector, and materials students should have at hand immediately on completion of the showing. The importance of careful planning cannot be overemphasized. Many an otherwise good lesson can be ruined because some small detail such as an extension cord or darkening of the room has been overlooked.

Perhaps one of the places where motion pictures are of greatest aid is in the first step in teaching—preparing the learner or building up interest in the instruction to follow. Scenes showing the application of things to be taught are of assistance in getting students to see the importance of the instruction. The dramatic treatment possible in pictures and sound often exceeds the most skillful teacher's ability to create real interest; however, this advantage can easily be lost if the instructor fails to make clear the purpose of the picture and then, after it is shown, fails to have an immediate follow-up capitalizing on the interest developed.

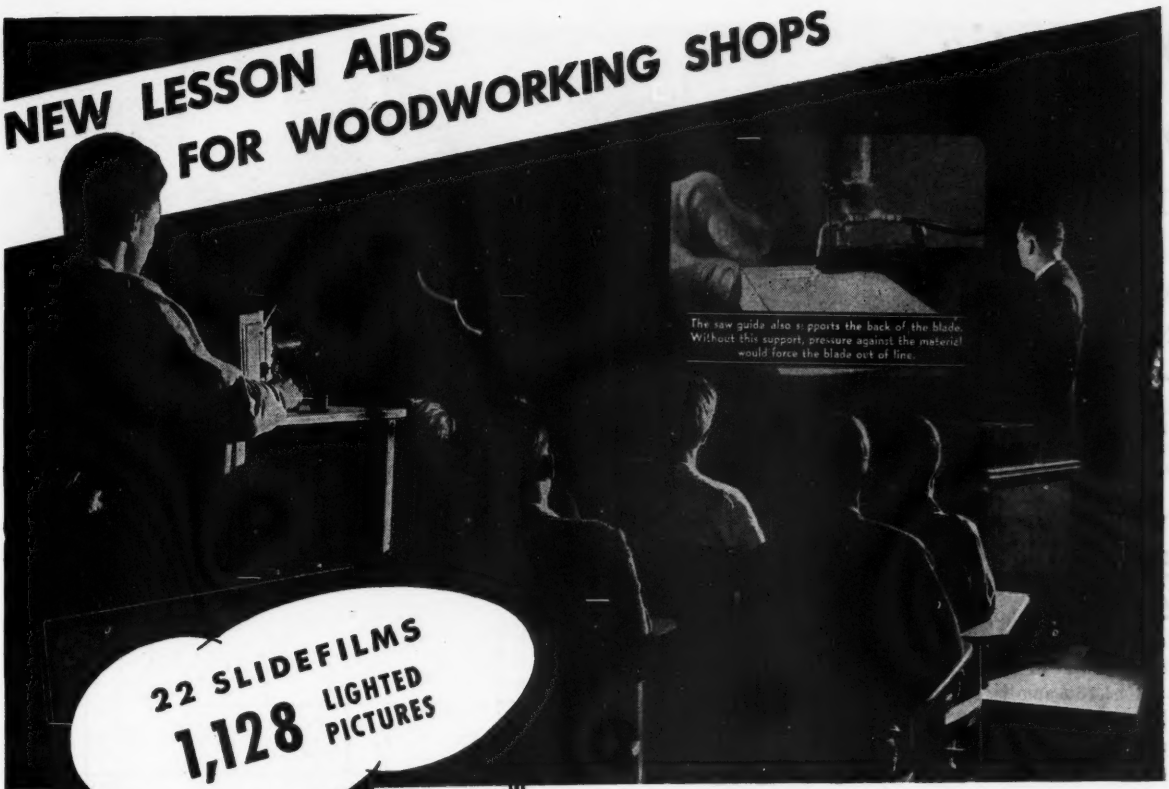
The National Safety Council film strips "Safety Management for Foremen" are an excellent example of well-planned lessons using both visual and sound devices. The over-all objective of the lesson is contained in the title. Appropriate music is provided to establish the mood desired. The presentation is given in dramatic form, using examples readily understood by the group. The discussion presented is typical of the kind of discussion desired from the group of learners after the showing. A short selfscoring test is provided to challenge the alertness of the group, and a discussion outline is available to assist instructors in conducting a lively conference based on the facts presented in the film and the interest developed. In spite of this well-worked out lesson plan, we know of many instances where these film strips and records have been presented merely as a "show" without any guided discussion as a follow-up, and their greatest value has been lost. Again, the visual device is only a part of a complete plan of instruction.

Visual aids designed for use in Step II of teaching—presentation of the lesson or the actual instruction of learners—are sometimes difficult to use because they seldom provide the kind of content needed by an entire class at the same time. For example, "Straddle Milling" is a lesson which is so specific that it may be worthless to any students other than those who are in immediate need of such instruction in order to perform a job of straddle milling. On the other hand, if the objective of the lesson is to develop an understanding of production methods used in industry, such a film might be very useful. The important thing is that the instructor has appropriate and clear-cut objectives in mind each time a visual aid is used, and that the entire lesson, including the showing of a film, contributes directly toward the objectives.

Thus far, we have pointed out some disadvantages and cautions in the use of visual aids. The points in favor of visual instruction are so great that every forward-looking instructor will endeavor to bring their advantages to his students. Motion pictures such as those on arc welding and automotive subjects make instruction tremendously meaningful through use of slow motion and ani-

(Continued on page 30)

NEW LESSON AIDS FOR WOODWORKING SHOPS


The saw guide also supports the back of the blade. Without this support, pressure against the material would force the blade out of line.

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8. Belt Sander
9. Lathe—Parts—Spindle Turning
10. Lathe—Faceplate Turning—Other Operations
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12. Jointer
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14. Circular Saw—Setting Up—Operating

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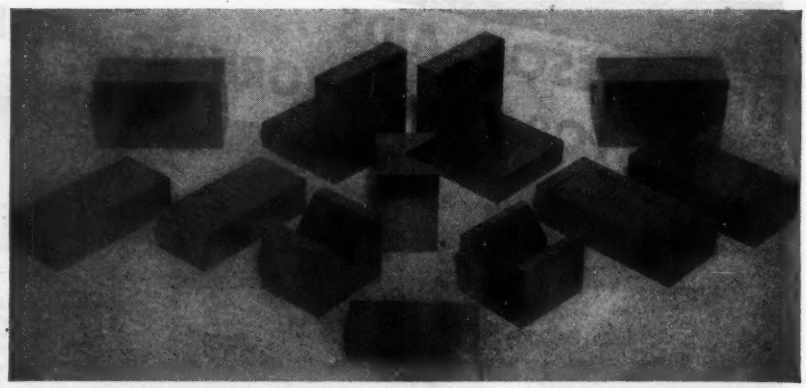
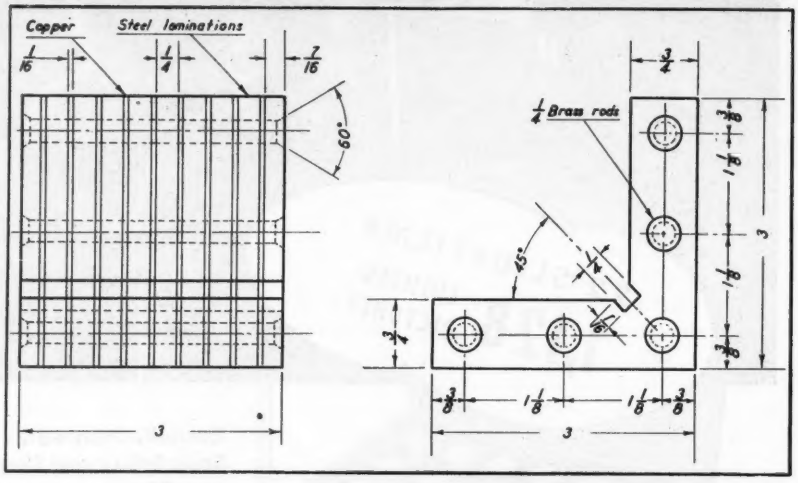
WRITE FOR CATALOG OF SLIDEFILMS ON OTHER SUBJECTS

Magnetic V-Blocks and Parallels

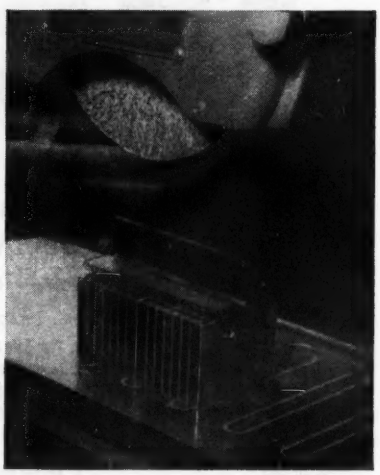
BY *Jon P. Adams*
AND *M. B. Goodwin*

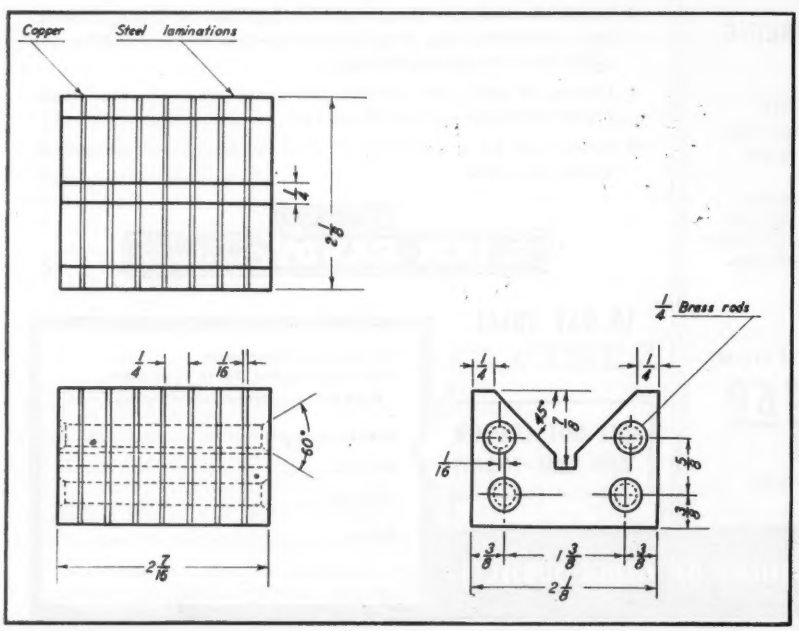


Student interest is high when working on this eighth project in the machine-shop series report the authors who are instructors in machine shop in the Proviso Township High School, Maywood, Illinois.

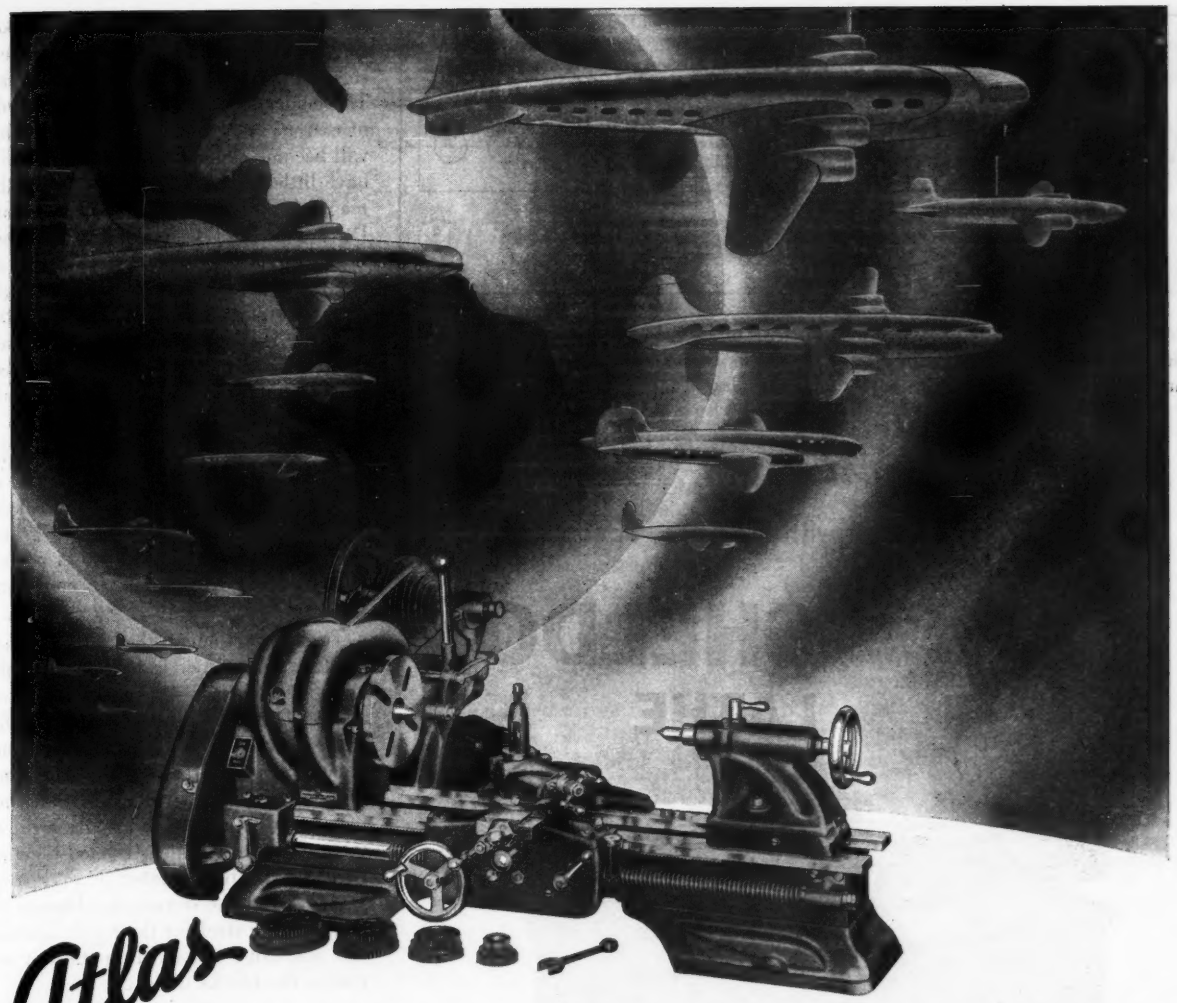


THE projects described in this article are valuable in the machine shop having surface grinding equipment. The magnetic parallels are used to hold small pieces that would be too small to extend over the pole pieces of the magnetic chuck and are also used on tool work where extreme accuracy is needed. It is not feasible to grind the top of the magnetic chuck each time to produce the accuracy needed in some classes of work, hence the magnetic parallels are used to hold the work and a cut is taken off the parallels after installation on the chuck and before the work is mounted on them. The magnetic V-blocks are handy to use to grind small pieces having ground surfaces at a 45° angle. One type of set-up is shown in the illustration. In this case a tool-steel V-block is being held in the magnetic V-block so that one of the 45° surfaces may be ground. In this case the tool-steel V-blocks are a pair so a pair of magnetic V-blocks are used. If the piece being held is some distance from the magnetic chuck and heavy cuts are to be taken, it is advisable to place a support such as a parallel or some square piece of stock against the left end of the piece being ground to help hold it in position. For normal light cuts this is not necessary.





Because the distance from the magnetic chuck to the piece being ground is great in the case of the magnetic angle plate, do not construct this project with the hope that it will hold a piece solidly enough to grind. It does facilitate set-ups, however, and the piece may be clamped in place with toolmakers'



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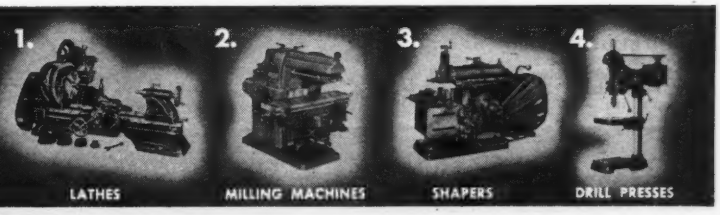

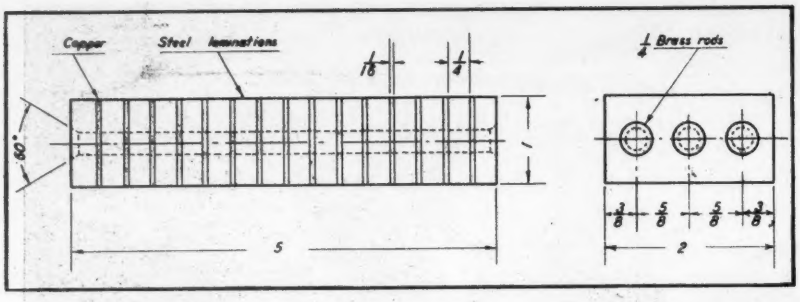

clamps. The angle plate will hold the piece solidly enough while the set-up is made.

The construction of any of these items is extremely simple. Several materials were tried both for insulation and for the magnetic parts. Laminated bakelite was found to be all right but preference would be given copper or brass. The magnetic pole pieces must be made of extremely soft steel so that the piece will become magnetized readily and will have little residual magnetism when the magnetic chuck is in the off position. Do not attempt to make any of these tools with soft-carbon steel such as S.A.E. 1020 because it is not soft enough. The only steel that would work satisfactorily is silicon steel of the type used for transformer laminations. This steel may be secured from most steel supply firms.

Any gage may be used and the laminations built up so the total thickness of each section is ¼". The thickness of the magnetic insulators of copper is 1/16". This thickness may vary a little, preferably thicker. Old half-tone engraving plates may be used quite successfully.

To construct one of these tools a stack of steel and copper is built up and the holes are drilled through the entire stack. The end plates are made of 1020 steel ⅛" thick so that they may be countersunk for the brass rivets. The stack of pieces is made oversize so that they may be milled or shaped to the required size. The stack is then riveted together with the required number of brass rods as shown on the drawings. Do not attempt to use steel for these pins because this will cause a magnetic path that will render the blocks useless.

All of the projects are first assembled as a stack of laminations and then are machined to size. In the case of the magnetic V-blocks the "V" may be milled with a 90° included angle cutter or the blocks may be clamped to the adjustable angle plate described in SCHOOL SHOP for December, 1944. After the pieces are milled or shaped they are then ground all over. The V-blocks must be ground in pairs. This may also be done on the adjustable angle plate.

The 45° angle on the V-block may be checked with the sine bar described in the February issue of SCHOOL SHOP. In this case the block would have to be clamped to the sine bar and the bar set up for an angle of 45° which would be a stack of blocks 3.5355" high. The 45° surface is then checked with an indicator mounted on a height gage or surface gage.

These projects involve lay-out, milling or shaping, surface grinding, and angular surface grinding and the authors find the student fascinated by their construction.

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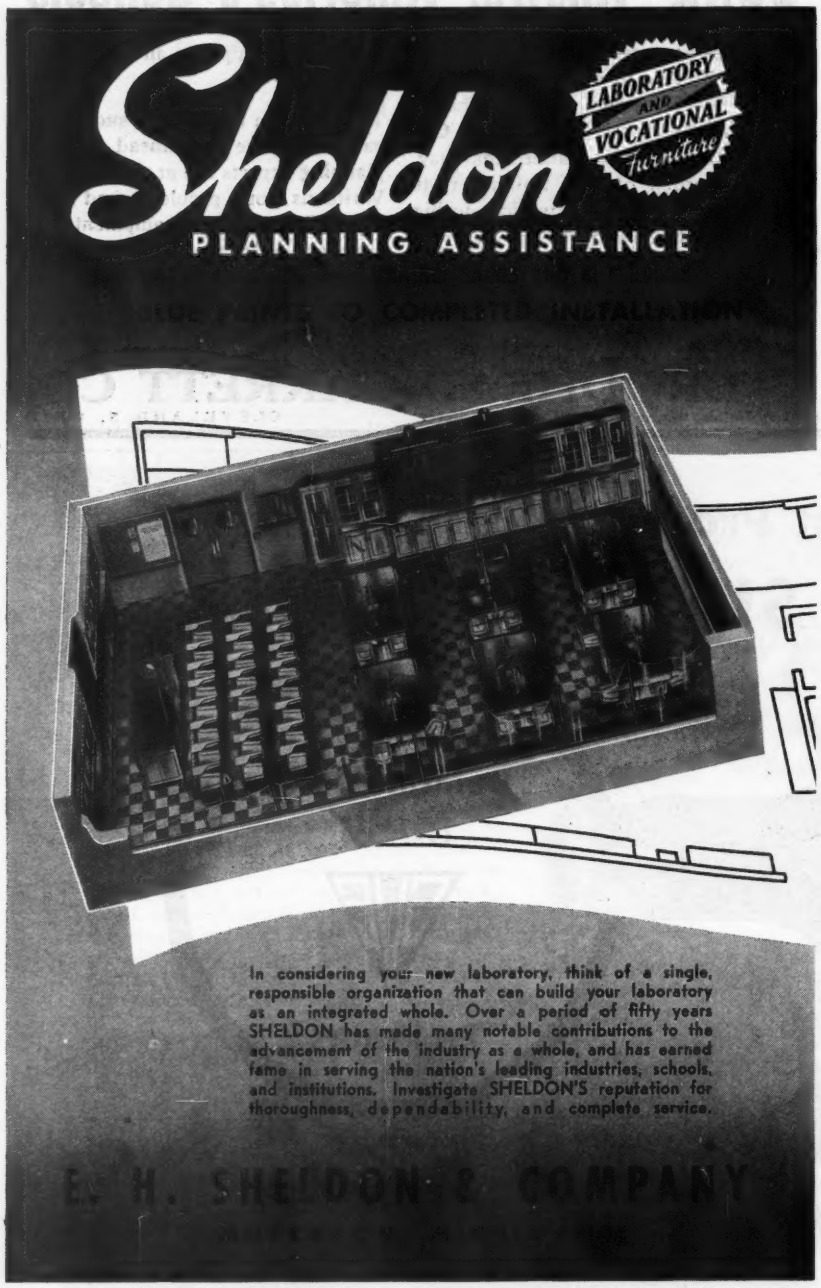
ABOUT YOUR FELLOW TEACHERS

F. A. VAN EYNDE, former vocational education representative of the U.S. Office of Education, is now district supervisor of trade and industrial education, Stair Technical High School, Knoxville, Tenn. . . . M. L. CUSHMAN, formerly of Cornell University and now at Willow Run, Mich., has been named assistant professor of vocational education, Iowa State College, Ames, Iowa . . . ANDREW D. ALTHOUSE of the Detroit Public Schools has recently been elected president of the National Association of Technical Schools and Institutes. WILLIAM E. STIRTON, principal of Cass Technical High School in Detroit, has been named secretary of the organization . . . G. DAN ROBISON, JR., has been appointed eastern sales manager, with headquarters in New York City, of the Silver Burdett Company. Mr. Robison has been sales representative in Tennessee for the past nine years, and before that taught at the Paris, Tenn., High School . . . C. M. COOK has accepted the position of director of vocational education with the Selinsgrove Borough School District, Selinsgrove, Pa., going there from Hanover, Pa. . . . C. V. WILLIAMS, for many years head of the vocational training department of Kansas State College, died recently in Manhattan, Kansas . . . ERNEST L. SCHROEDER, general sales manager and director of advertising for the Victor Animatograph Corporation, Davenport, Iowa, manufacturer of 16mm projectors, cameras, and equipment, has just rounded out a full quarter of century of service with the organization. Schroeder joined the firm as an apprentice in the dark room . . . New state director of vocational education for New Mexico is FRANK WIMBERLY, former state supervisor of vocational education and agriculture . . . Mu Sigma Pi, graduate fraternity in industrial education at Wayne University, Detroit, has elected the following officers for the 1945-46 term: President, ROBERT SHIELDS; vice-president, ARTHUR DUNHAM; corresponding secretary, JAMES HENDRICKSON; recording secretary, HAROLD DELONG; treasurer, GORDON RIVERS; and executive board, THOMAS MONROE . . . Sheldon Machine Co., Inc., of Chicago announces the appointment of LYMAN H. BELLOWS as sales manager. Bellows was formerly with Stanley Electric Tools . . . ROLLIN KENNERLY is now teaching at Dobyns-Bennett High School, Kingsport, Tenn.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Graphic Arts . . . . *from page 12*

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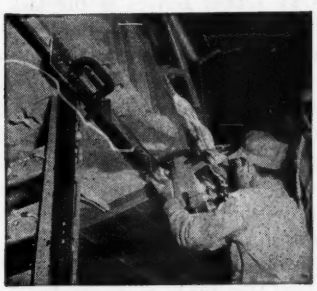

Illustration shows a section of a Liberator B-24 at the mating jigs in the final line of assembly at the San Diego Division of Consolidated Vultee Aircraft Corporation.

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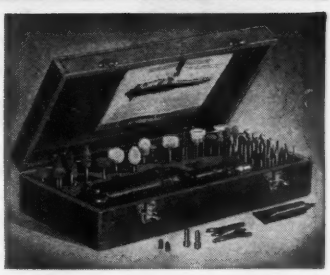

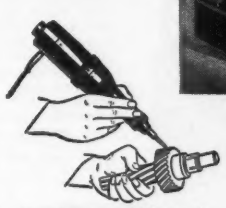

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WHAT'S DOING IN THE FIELD OF INDUSTRIAL EDUCATION

NUMEROUS aviation training aids, obtainable for civilian use now that the Army Air Forces training program is no longer expanding, will soon be demonstrated throughout the country. A group of nine teams from the Army Air Forces will cover the itineraries worked out by the U.S. Office of Education and the Preinduction Training Division in conjunction with state superintendents of schools. At meetings arranged by local school authorities one of the members of the team will explain how the Army Air Forces uses instructional aids, suggest how schools and colleges may use them in varied courses, explain how to select and obtain desired equipment, and reiterate the importance of preinduction training in science, mathematics, physics, and vocational subjects. The demonstration will contain samples of mock-ups of engines, carburetors, devices to explain principles of hydraulics, electricity, and machines. Photographs of the more than 200 Army Air Forces technical training devices available to schools will also be shown; mock-up construction diagrams for each item, part list and stock numbers, suggestions for using the item as a training aid, and directions for assembly will be included, as well as training films, filmstrips, and manuals. Materials offered pertain only to Army Air Forces technical training and not to the training of pilots, bombardiers, or navigators. Requisitions for equipment will be handled through the nine regional Army Service Forces Preinduction Training Officers.

SCHOOL Crafts Club of New York City held its annual meeting January 20 in the Hotel Imperial in New York. The present staff of officers was reelected for the coming year: president, Philip M. Wagner; vice-president, Loring J. Barker; secretary, Ralph Carter; and treasurer, Charles G. Fischer. At the meeting, Charles Kacsur of Brooklyn gave an illustrated talk on gem stones and jewels, and L. Omer Asher, president of the New Jersey Vocational and Arts Association, discussed the trend of industrial arts as indicated by conferences at the December AVA Convention in Philadelphia.

GOVERNMENT surplus property has been accumulating at a faster rate in recent weeks. Although educational materials have not yet been declared surplus in large quantities, many items in the government stockpile are used by schools and colleges. Chief difficulty encountered by school buyers is the lack of pertinent information available. Best sources of information at the present time are: *Small Business Problems—Buyer's Guide for Surplus Property* (Senate Committee Print No. 19, 78th Congress, 2nd Session, revised edition, Nov. 2, 1944, Government Printing Office, Washington 25, D. C., 10c) and *Surplus Reporter* (address nearest regional office of the U.S. Treasury, Procurement Division). Since surplus property has not been collected at any central warehouse but has remained at the point where it was declared surplus, and since no adequate summaries have been made in regard to this property and its condition, the prospective buyer must pursue such information himself. One of the most practical suggestions is to write to the regional office of the U.S. Treasury, Procurement Division, for a list of the warehouses in the region where the school system is located. Periodic visitation and inspection of materials may thus be made.

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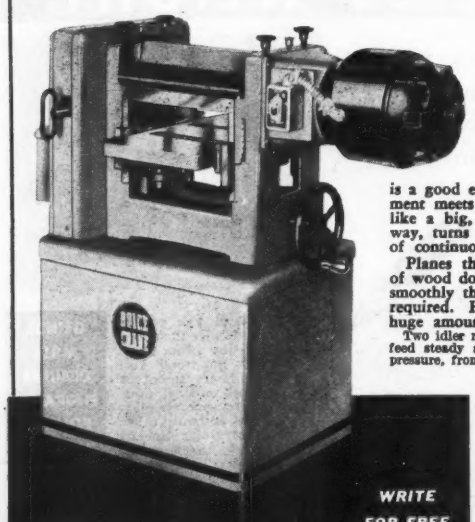

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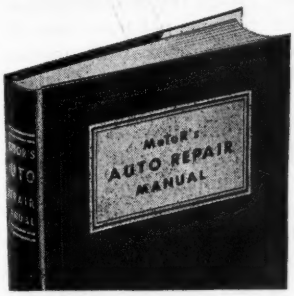

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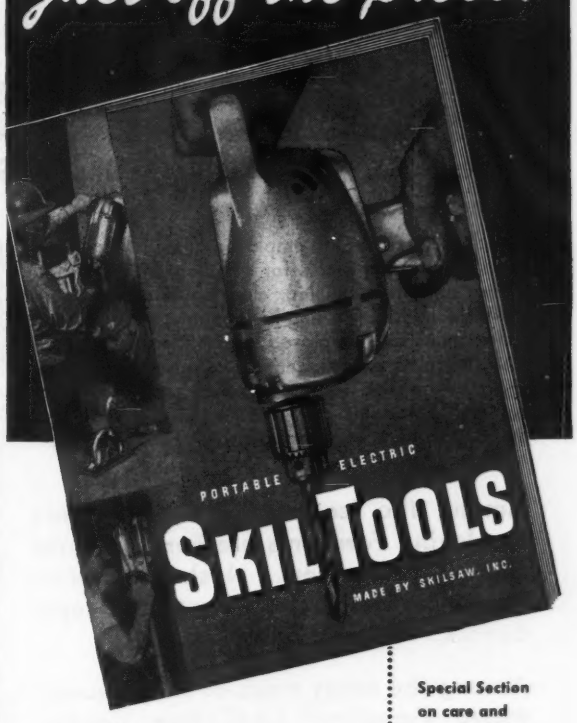

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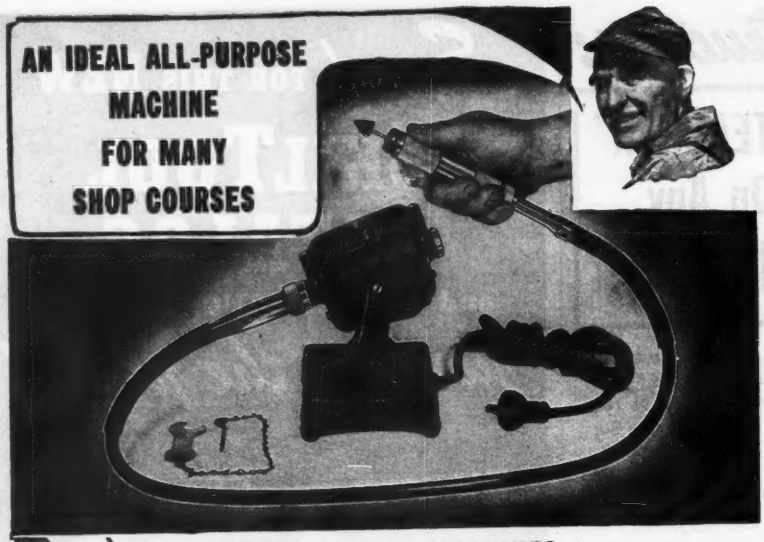

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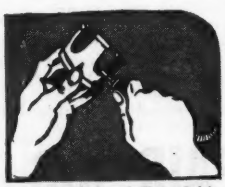

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School Shop KINKS

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Six Things to Remember When Using Today's Solders

Today's solder decidedly differs from prewar solder, and so should soldering technic. Previously solder was composed of tin and lead in about 50-50 ratio; today, except for certain applications, solder contains not more than 20 percent tin, with perhaps small amounts of silver, bismuth, or antimony. Today's soldering technic calls for a hotter soldering iron and attention to certain details. How to make better soldered joints has been explained in a communication issued by the metallurgy committee of the General Electric Company:

1. Keep your work clean. Guard carefully against varnish, grease, oil, dirt, rust, or corrosion products. They prevent the flux from acting and the solder from alloying with the parent metal.

2. Keep in mind that the purpose of the soldering iron or torch is not to melt the solder but to heat the work until the solder will flow when applied to the work.

3. Keep the soldering iron clean and, to have the quickest possible heat transfer from the iron to the work, have the tip designed actually to fit against the work.

4. Investigate different methods available for doing the work—hotter electric iron, high frequency, or carbon resistance soldering tools may be better.

5. Design your joints to have 0.003″ to 0.005″ solder thickness, and so that the two parts overlap. Lap or seam-type joints are better than butt-type joints. Have the solder fill the seam completely. Heavy fillets add little strength to the joint and waste solder.

6. Don't hand a new solder, a flux, and a soldering job to a person and expect a perfect job the first time. Let him get the "feel" of the new material. Don't give up a new solder after one unsuccessful trial—the chances are your technic is not what it should be for that particular solder.

Waterproof Cement

Use hot starch paste and add turpentine to the amount of half the weight of the paste plus a small piece of alum.—*I. M. Fenn, Chicago Vocational School, Chicago, Ill.*

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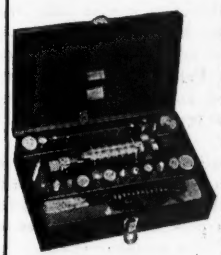

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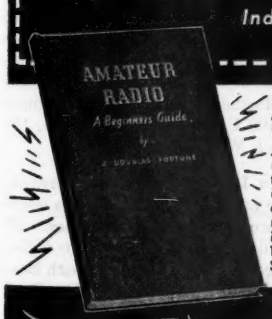

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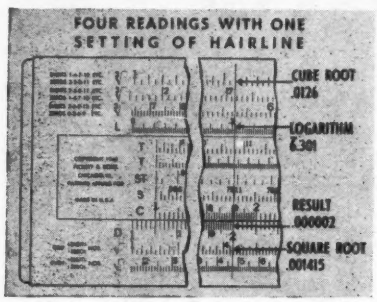
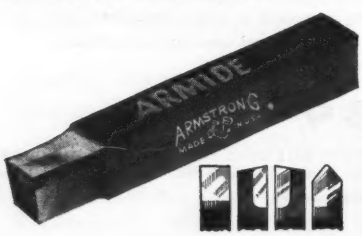


An illustrated instruction manual, written by M. L. Hartung, Associate Professor of Mathematics, University of Chicago, gives instructions for beginners, rules for operating the Deci.Point, and presents the mathematical theory of mechanical decimal point location.

For full details write to Pickett and Eckel, 53 West Jackson Boulevard, Chicago 4, Illinois, or *check number 58 below.*

Armstrong Extends Line of Tool Holders and Cutters



Armstrong Bros. Tool Co. have extended their line of Armstrong Carbide Tool Holders and Armide Carbide-Tipped Cutters. These tool holders, expressly designed for use with carbide-tipped cutters, now come with straight, right-hand off set, or left-hand off set shanks, each in seven sizes. The Armide cutters are tipped with carbides of two grades—Armide Red for machining steel and Armide Gray for machining cast iron, bronze, brass, aluminum, and nonmetallics. All sizes of the cutters come ground in four standard cutter shapes, and in two weights—standard or heavy duty.

These standard carbide-tipped tools, which have been designed for general use, will be sold through industrial supply houses, either singly or in matched tool holder and cutter sets. The sets are boxed in fitted steel cases.

For further information write the Armstrong Bros. Tool Co., 317 N. Francisco Ave., Chicago 12, Illinois, or *check number 59 below.*

Special Machines from Delta Standard Tools

Delta-Milwaukee Blue Book for Management, Shop and Production Engineers is a 76-page book presenting case histories of 140 special-purpose machines. The designs, employing standard Delta low-cast tools, are almost entirely the work of production men in various well-known plants. A wide variety of operations on metals, plastics, and wood are illustrated and described. Write The Delta Mfg. Co., 600 East Vienna Ave., Milwaukee 1, Wis., or *check No. 60 on the coupon.*

Stanley Electric Tools Offers Attachment for Magnifiers

Stanley Electric Tools, New Britain, Conn., offers an attachment for their "Flud-Lite" magnifiers, nos. 701 and 701H—an auxiliary lens, No. 05, which doubles the magnifying power of the popular Stanley inspection tools, equipped with fluorescent lamps. Use of the auxiliary lens is recommended for close inspection work and assembly of small parts whenever additional magnification is required.

The lens is 2½" in diameter and is set in a cup-shaped frame. It fits easily under the lens frame of the magnifier and can be attached or removed quickly.

For complete details write the Stanley Electric Tool Division, The Stanley Works, New Britain, Conn., or *check number 61 on the coupon.*

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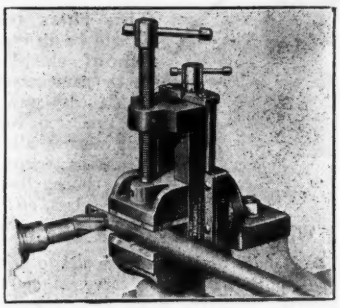

Chicago Tool and Engineering Co. announces the No. 250 Palmgren Milling Attachment with vise, which can be mounted on the cross slide of any standard engine lathe and makes possible many intricate milling operations. By using the lathe's cross slide horizontal feed and the Palmgren milling attachment's vertical feed and angle adjustments, practically any lathe becomes a universal milling machine.

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The Society for Visual Education announces a new Picturol catalog which lists many of their new slidefilms on such interesting subjects as "Romance of the Alaska Highway," "Elementary Meteorology," "Mathematical Instruments," "Theory of Flight." Some of the slidefilms are accompanied by teacher's manuals, and others include full information in the titles and subtitles of the slidefilm. Copies of the new catalog are furnished free on request to the Society for Visual Education, Inc., 100 E. Ohio St., Chicago 11, Illinois, or *check No. 65 on the coupon.*

How to Run a Lathe (43rd edition, revised) contains the latest information on the operation and care of metalworking lathes. 128 pages, 365 illustrations. Paper covered, 25c; leatherette covers, 75c. Write to South Bend Lathe Works, 181 E. Madison St., South Bend 22, Ind., or *check number 66 and enclose money.*

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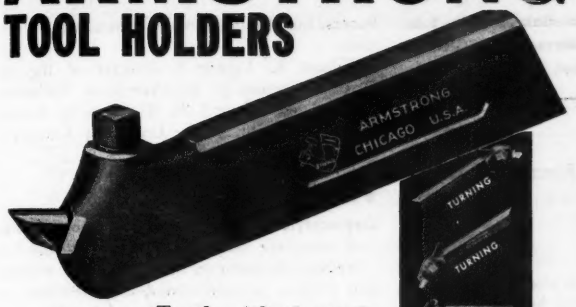

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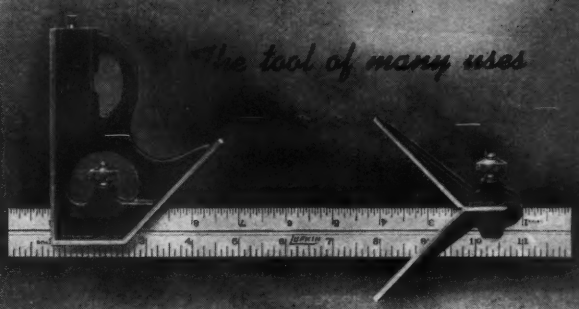

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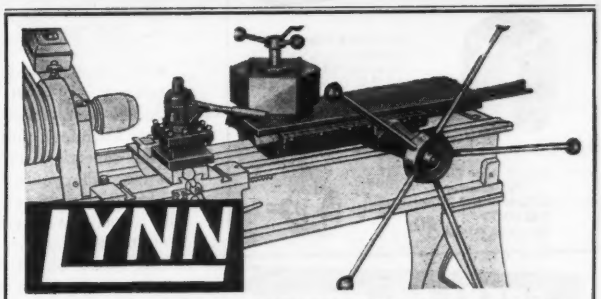

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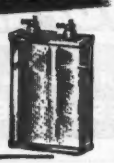

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BOOKS:

Mathematics for Aircraft Engine Mechanics. Griffiths. New York: McGraw-Hill Book Co., 1944. Pp. xv + 367. $2.50.

The aim of this text is to teach mathematics so it may be used as a tool by which a complete knowledge of the aviation engine may best be assimilated.

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Harold Griffiths is an instructor in the Brazilian division, Embry-Riddle School of Aviation, Miami, Florida.

Simplified Time Study. Myers. New York: Ronald Press. 1944. Pp. viii + 140. $2.50.

Many companies do not have a time-study department and most points of operation are too small to support a resident time-study engineer. Therefore, this book has been prepared for the supervisor, foreman, shop steward, or cost man who would like to know time study for his own purposes and should like to be able to make a practical time study himself, if the occasion arose.

The book's object is to make the subject as clear and simple as it is possible to do. It has been forged out of experience, and has grown directly out of instructions prepared to meet the needs of factory men.

Herbert J. Myers is controller of the Farnsworth Television and Radio Corporation.

How You Can Get a Better Job. Lasher and Richards. Chicago, Ill.: American Technical Society, 1944, (Second edition, revised) Pp. 206. $1.50.

The four parts into which this guidance book is divided best explain its theme: The Human Element, Selfmanagement, Selling Yourself, and Getting Ahead. For this is a book written primarily for the person who is interested in better employment. Practical ideas, which have been used and developed by the authors on the hiring-line, help the reader to selfevaluation in relationship to his part in the industrial world. Written clearly and readably, the subject matter includes such topics as behavior and earning power, shop talk, office talk, telephone technics, tongue boners, leisure time, how to find a job, promotions.

Willard K. Lasher is director of the industrial division of the American Technical Society and Edward A. Richards is former associate director of the University Extension Division, Columbia University.

VISUAL AIDS:

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Catalog of 16mm. motion pictures to be used as a teachers' guide in the selection of visual material for instructional purposes is announced by Walter O. Gutlohn, Inc. Comprised of three sections, the catalog is the first of its kind ever to be released by a commercial source. The first section lists films evaluated by panels of educational specialists under the supervision of the Advisory Committee on the Use of Motion Pictures in Education; the second lists films approved by representative groups and individual teachers; and the third section contains recently released subjects which have not as yet been previewed, but which should find a prominent place in the field of teaching. Copies of this catalog may be obtained directly from Walter O. Gutlohn, Inc., 25 W. 45th St., New York 19, N. Y. *Please mention* SCHOOL SHOP.

PAMPHLETS:

Our Forest Resource and its Conservation is a bibliography of study aids relating to American forests and their conservation. It presents several new items offered free to instructors and school libraries, such as booklets, wall charts, posters, and films. A copy of the illustrated bibliography may be obtained by writing American Forest Products Industries, Inc., 1319 Eighteenth St., N.W., Washington 6, D.C., *mentioning* SCHOOL SHOP.

Occupations in Plastics is a six-page folder published by Occupational Index, Inc., giving brief descriptions of 15 different jobs in plastics. The abilities and preparations required, methods of getting a job, average earnings, and the principal manufacturing areas are listed. For those who wish more detailed information, the four best books have been selected from 58 sources examined in preparing the abstract. Sixth in a new series of *Occupational Abstracts* covering fields in which postwar employment prospects are favorable, copies are available at 25c each. Write Occupational Index, Inc., New York University, New York 3, N. Y., *mentioning* SCHOOL SHOP *and enclosing 25c.*

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from Washington *from page 32*

sufficiently attractive to a first-class man remains to be seen.

● Commissioner Studebaker also passed on the following information:

That strengthening of the Office of Education does not in any way imply that the federal government is getting ready to interfere with or take over control of school programs in the states. "I have been consistently opposed to such interference," Dr. Studebaker said.

That the Office does not have and does not want any field offices in the states.

That only the regular, "time-honored service" functions of the Office will be strengthened, i.e., research, publications, and counsel. The machinery which administers federal-state programs will be unaffected.

That a new monthly publication entirely devoted to vocational education is proposed.

That the success or failure of his plan lies in the hands of seven men—the seven Congressmen who form the subcommittee on Office of Education appropriations. But ultimately, the fate of the plan lies in the hands of educators themselves, he added. "I hope," Dr. Studebaker said, "that the educational profession will demonstrate that it can see the forest and not let a tree obscure it. We can all argue about detail. We can all suggest better organization charts. We can probably improve on the set-up and as time goes on, I will myself suggest changes. But if we can all agree that the Office of Education ought to be put into a position to do what it was set up to do—then these things can be adjusted later."

There was no doubt that "the little things" could be adjusted; but as the Commissioner sent his report to Capitol Hill there was considerable doubt that the lawmakers could agree readily on the basic proposition.

Visual Aids *from page 14*

mated diagrams. They help clarify technical points difficult to put across by conventional teaching methods. They bring to the classroom and shop the skill of professional illustrators and the advantage of showing the "inside" of complicated mechanisms.

There are many times when motion pictures can be used to transport students to the scene of industrial activity. The building of a house or skyscraper, the pouring of steel from an open-hearth furnace and the rolling of white hot ingots, the felling of giant trees and the milling of lumber, are typical of the industrial scenes which are usually inaccessible to students, yet they can be intimately portrayed through the use of well executed motion pictures. "Field trips" are now possible regardless of distance and transportation problems. The use of films of this kind fits nicely into the teaching plans of both industrial arts and trade instructors.

The expanded use of visual aids in the teaching of practical-arts subjects is a certainty. Now that projection equipment and large film libraries are rapidly becoming available, the number of instructors experimenting in their use will rapidly increase. If their initial attempts at using visual aids are unsuccessful, they may gain the idea that such instructional devices are not good. If on the other hand they look on visual aids only as additional instructional tools and carefully plan the lessons in which they are to be used, their experiments will result in *better teaching* but not less work for the teacher.

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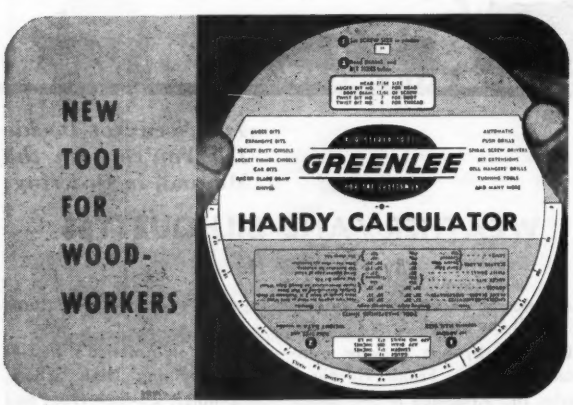

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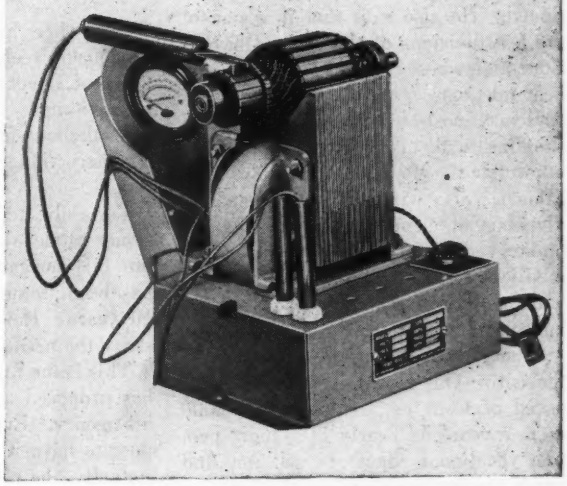

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from WASHINGTON by MICHAEL PACA

THE most interesting fact about the proposed reorganization of the U.S. Office of Education is that the Vocational Education Division won't be reorganized at all. Only the name of the head of that division would be changed—from *assistant commissioner* to *director*. Several new professional people would be added to the staff (the present 49 to be increased to 62) and extra clericals would be hired.

Commissioner of Education John W. Studebaker says frankly that the present pattern of the Vocational Education Division has proved satisfactory for more than two decades and will be continued. He also says that it is one of the few divisions of the entire Office of Education whose staff has been anywhere near adequate.

Hence, most of the revamping and reshuffling will take place in branches other than the Vocational Division. New branches also will be created—such as divisions of elementary education, secondary education, and a division for auxiliary services, which will have to do with matters of school lunch, libraries, and visual education.

Thus, while a six-fold expansion of the entire Office of Education is to be asked of Congress, requiring $800,000 more a year and nearly 1100 more people, vocational educators will not find much change proposed in the division designed to serve them.

● Unfolding of the reorganization plan first took place during an interview Commissioner Studebaker granted your reporter. He was candid; even flagellate. He said that during the first 67 years of its existence (from 1867 to 1934), the Office of Education had a staff of about 70 persons. Its organization, he said, was "archaic," a "hodge podge," and its staff woefully small. In 1934, Dr. Studebaker continued, the Federal Board for Vocational Education was transferred to the office, adding several score of specialists to the staff. Ten of these specialists are at work improving the instruction of 318,223 students in agriculture; nine specialists serve 497,139 students in home economics; and nine specialists serve 206,922 students in trade and industry.

"What would you do," Dr. Studebaker asked, "if you had the job of improving the instruction of so many thousands of students?"

But even these modest staff provisions merely pointed up the fact that some areas such as English, science, and social studies were not provided for at all. Secondary education, which was making giant strides during this century, was served by only one person on the Office staff. Vocational-technical education, which was also growing, was not represented at all in the Office.

"We were and have been limping on all fronts," Dr. Studebaker said candidly. "Our influence has been altogether inadequate when measured against the need for educational leadership in a great Nation."

● The time has come, Commissioner Studebaker feels, to put the house of the Office of Education in order. He wants to do it now—"now, when the Nation faces the long-term problems of postwar reconstruction, readjustment, and progress."

Certainly, no one can accuse Commissioner Studebaker of jumping headlong into this reorganization job. He himself has been Commissioner for more than 10 years. He has had ample time to study the needs of American education.

This is the first time, however, that he has proposed a thorough revamping of his agency. Even now he does not propose to have it reorganized all at once. Actually, the reorganization is a "three-year plan." It may take that long until Congress approves the changes and the Civil Service Commission recruits the added educationists proposed by Dr. Studebaker.

● To the question, why abolish the office of the assistant commissioner for vocational education, Dr. Studebaker replied that it was a question of good administration. He said that people in health, in rural education, in secondary education, and other fields have in the past demanded that their field shall be represented by an assistant commissioner. Under such a plan, there would be as many assistant commissioners as there are vice-presidents in a Fred Allen comedy show. But Dr. Studebaker looks at vocational education as one major division of seven others of education. It is as important, but no more so, than higher education, secondary, elementary, international education, school administration, and auxiliary school services, and so on. None of these divisions is to be represented by an assistant commissioner. Instead, each would be headed by a director, on the same level as the director for vocational education.

Now, the plan is that four of the directors will report to an assistant commissioner, called *A* for the time being; and four others will report to an assistant commissioner called *B*. Presumably, only these two officials will have the Commissioner's eye and ear. This, according to orthodox Washington policy, is thought to be good administration—and perhaps it is.

At any rate, Commissioner Studebaker has assured your reporter that the Vocational Education Division will not lose any of its status because the head of the division will have his title changed. The real question is who will head the division, if the reorganization is approved. Dr. J. C. Wright, present head, is soon scheduled to retire. And whether the proposed salary of $8,000 will be

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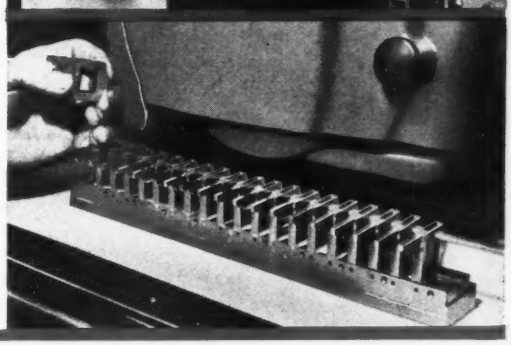

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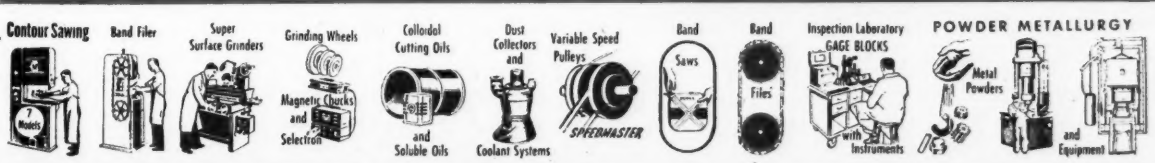

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